

easterly direction was less on the average than from the north-west. The actual difference in favour of the inward direction as given by the above reduction of the observations, is only 0.13 of a knot per hour.

A careful study of the under-currents in this channel shows that they have a complicated character. Their velocities and directions were obtained on seven different occasions, and at a series of depths to within about 15 fathoms of the bottom in water of 53 and 47 fathoms, at the two stations. On three of these occasions the under-current was found to be as strong or even much stronger than at the surface; but on the four other occasions it decreased in its velocity with the depth in the usual way. These variations also occurred with either direction of the surface current. If the surface velocity is taken as 100, the average velocity of the under-current between ten fathoms and the bottom varied from 38 to 182 per cent; and the general average of all the determinations showed it to be 95 per cent of the surface velocity. As the variation is so great it cannot safely be said in which direction the under-current would in general be the strongest, relatively to the surface current.

It is clear from the above observations that there is no constant inward current north of Anticosti, at all comparable with the Gaspé current. The difference of the flow in the two directions is however in favour of a very slight inward flow from the south-east. The temperatures taken at slack water after the flow in each direction, showed the usual decrease with the depth from 52° at the surface to 32° or 34° at 40 fathoms. There was no change in the temperature to accord with the direction of the current. The greater surface density towards the Mingan side is an illustration of the difference found on the windward and leeward sides of a channel. At 20 fathoms the density is practically constant all the way across. These temperature and density conditions tend therefore to confirm the view that any longitudinal flow through the channel must be very slight.

The tidal character of the current in the Mingan Channel is confirmed by Mr. A. Malhouin, Light-keeper at West Point, Anticosti. He states that the current runs from the south-east with the rising tide and from the north-west with the falling tide. The current on the south shore of Anticosti in that vicinity, is much weaker than in the Mingan Channel, and is under the influence of the wind, and runs accordingly from either the north-west or south-east. If the current from the south shore is from the north-west it appears to divide at West Point when the tide is falling in the Mingan Channel; but when the tide is rising, the currents meet not further east than English Bay, or about 8 miles from West Point. In the spring, the ice on the south shore drifts with the wind and current in an outward direction, from the north-west, except when the wind is easterly, which is not frequent. The ice is not over six feet thick except when packed or in shelves.

It is also stated by Mr. H. Pope, light-keeper and meteorological observer at South-west Point, that the wind is almost always N.W. or S.E.; that is to say, it follows the general direction of the channel between Gaspé and Anticosti. It appears that from May till the early part of August the winds are usually from the S.E. and from the middle of August through the autumn and winter, they are chiefly from the N.W.

The Gaspé current proper. The general results obtained with regard to the currents in the Mingan Channel and in the vicinity of West Point, also accord with the Sailing Directions where it is broadly stated that no constant outward current is felt to the northward of a line joining Point de Monts and Anticosti. Hence the various positions taken by the constant current which we have now to consider more fully, are limited to the northward; and the region already indicated, between the Gaspé coast and Anticosti, proves to be the best that could be selected for the investigation of its varying behaviour. On the Gaspé side the even character of the coast line of the Lower St. Lawrence, continues from Fame Point to Cape Rosier; and the bottom dips off abruptly all along; as the 30 fathom line lies only one mile off shore, and the 100 fathom line on an average three miles off. The current therefore does not extend to the bottom; but the depth in which it is necessary to anchor in making the observations is very considerable; and at all the greater depths the bottom is soft mud and poor holding ground. Patent stockless anchors were used, giving a double grip; and also heavy four-prong grapnels with specially large palms.

In the early part of the year the weather appeared to be more uniform than in an hour, and its direction varied from 30-27 to 29-75 which would be the observations to 6th may therefore. Also, as the moon was in the full, the tide, should be about 12 feet.

The current was measured at 10 miles N.E. $\frac{1}{2}$ N. from West Point. The depth at these stations was 53 and 47 fathoms. The observations, day and night, when the anchor was dropped, showed that the current was about 1 mile N.W. by W. The current appeared to be stronger than at the surface, though this increase was not of great equality. The fluctuation of the tide, as in general, was about 12 feet of the tide. This is against the direction of the current.

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In order to ascertain the direction of the current, the station was occupied at 10 fathoms, but the current there ran from 0-33 to 40 fathoms, but was not of great equality.

Further out to sea the current was about 1 mile N.W. by W. The current appeared to be stronger than at the surface, though this increase was not of great equality. The fluctuation of the tide, as in general, was about 12 feet of the tide. This is against the direction of the current.

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